Leveraging Commercial Communications for The Department of Defense

Lessons Learned

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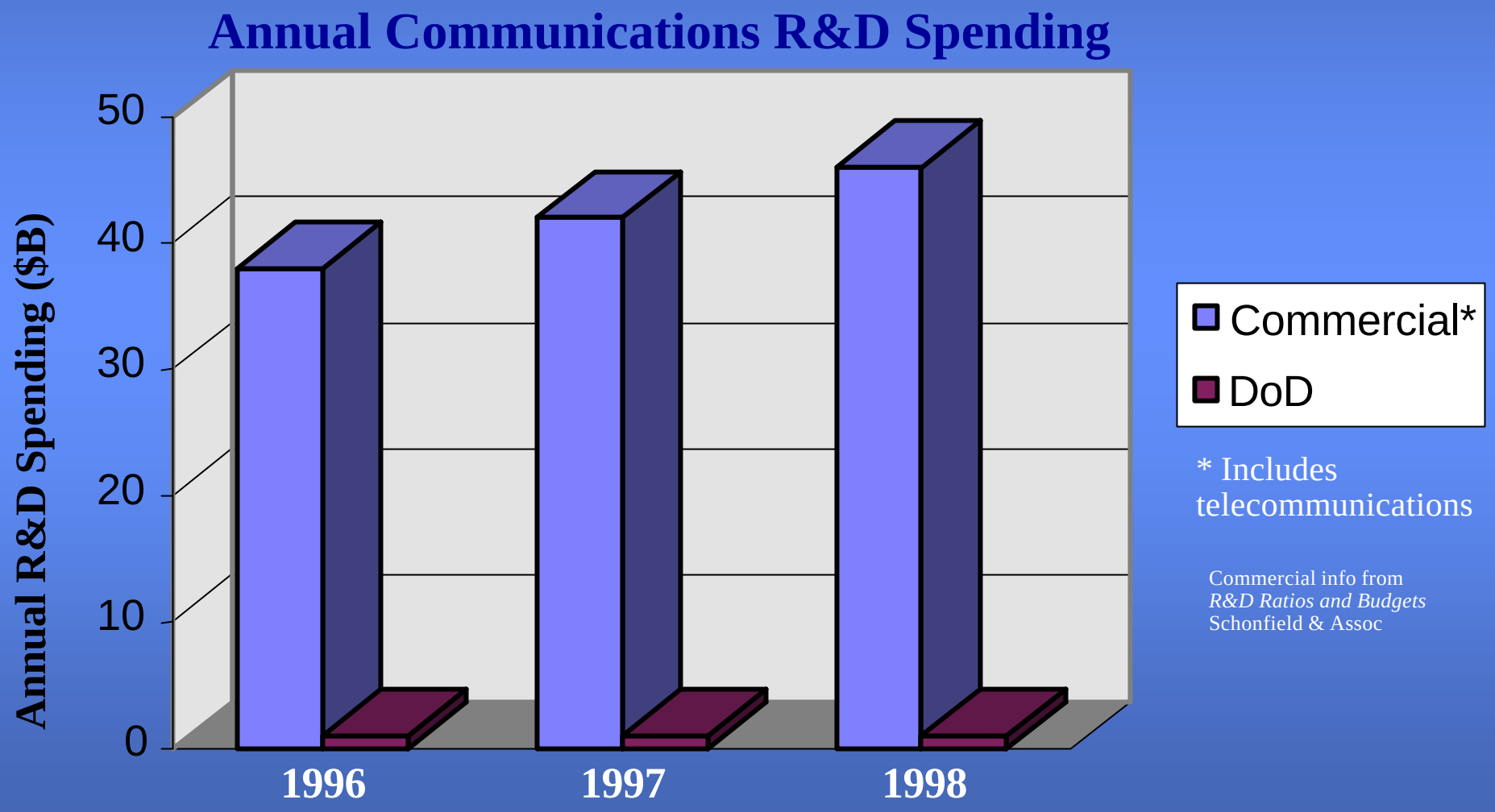
Outline

- Commercial Trends (Explosion/Implosion)
- Government Use Issues
- Strategic Leveraging Approach
- System Assessment
- Specific Examples and Lessons Learned

Commercial Trends
Paradigm Shift (1996)



* Includes telecommunications

Commercial info from
R&D Ratios and Budgets
Schonfield & Assoc

Commercial Trends
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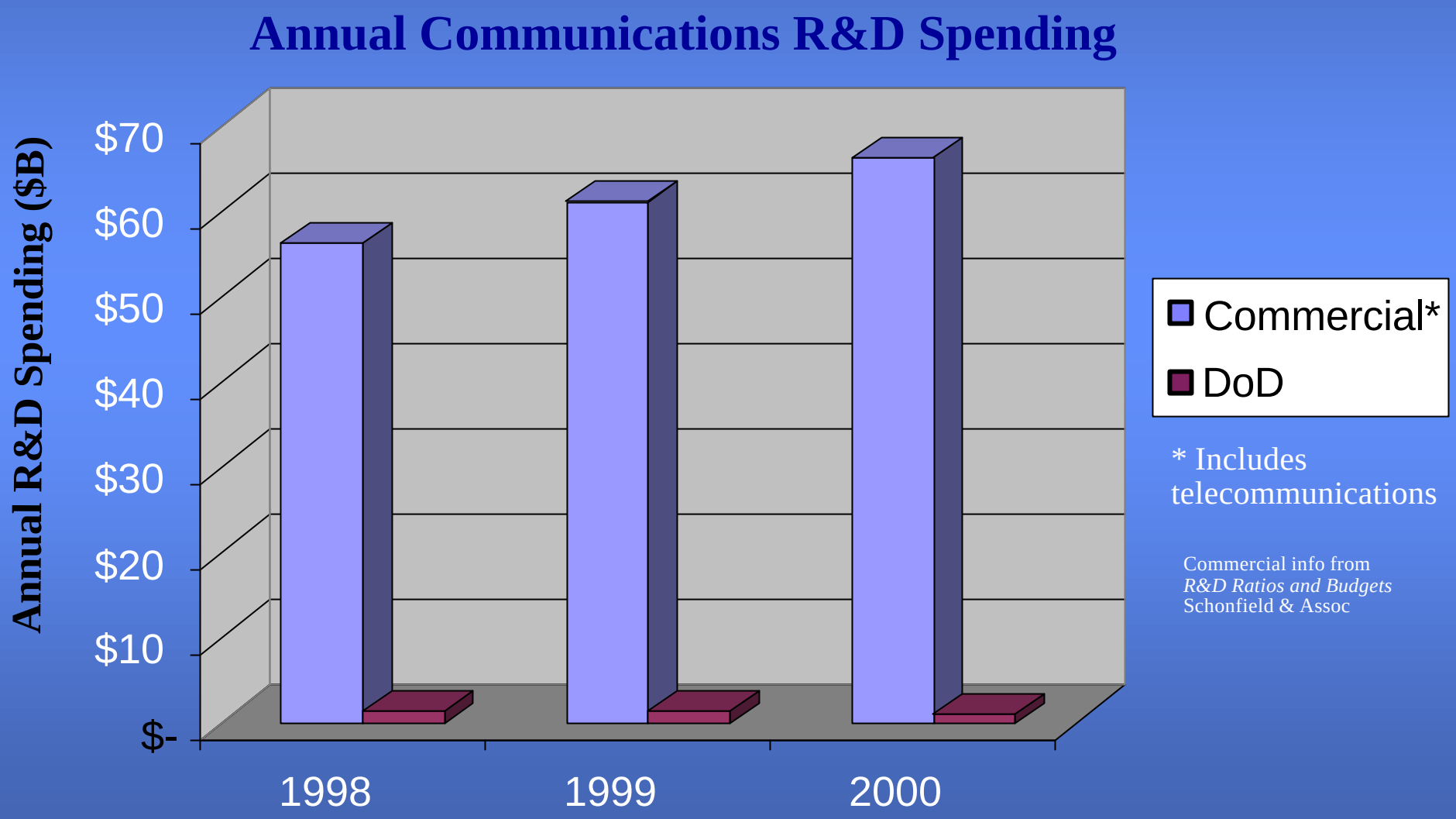

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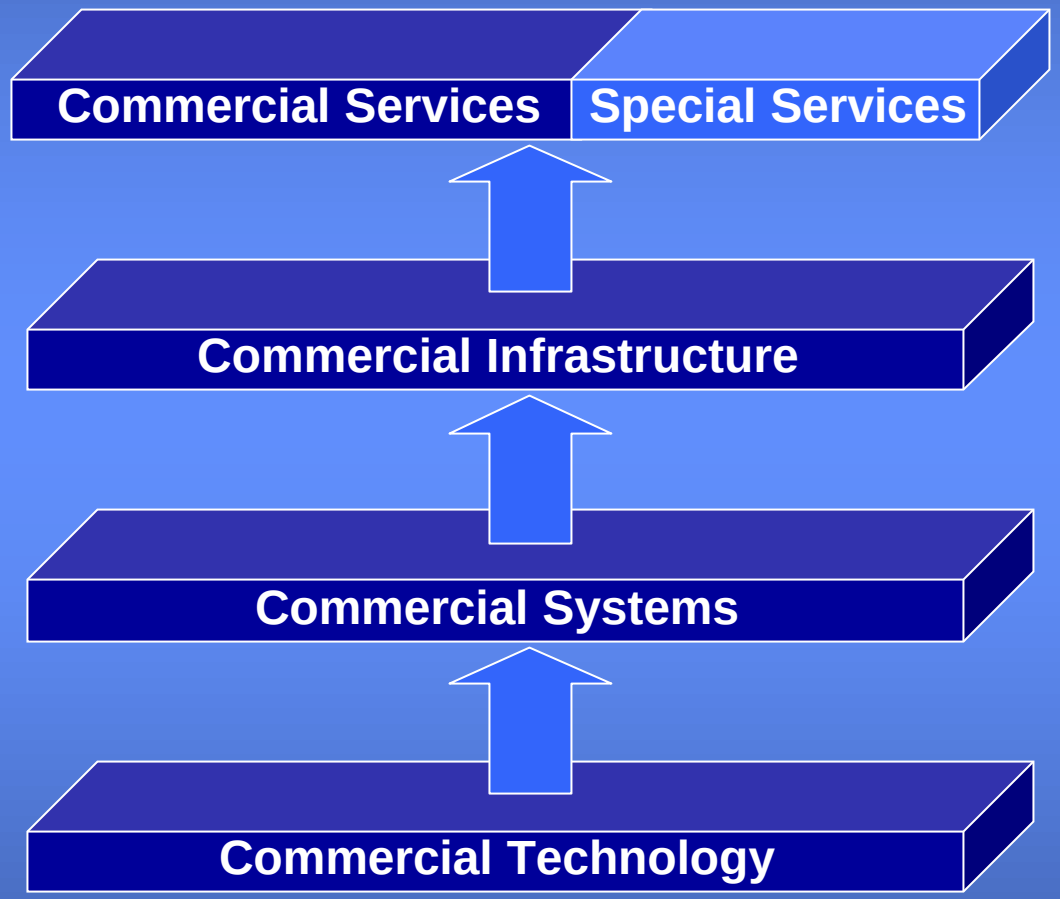
Issues in Government Use of Commercial Wireless

- Assuring access
  - Availability of capacity when and where needed
  - Vulnerability to denial of service attacks
  - Non-U.S. control of infrastructure
- Some military users have special needs
  - Mobile infrastructure
  - Non-standard services
  - Enhanced security
  - Limiting signals warfare threat
- Investment strategy–picking the marketplace winners
- Widening chasm between Government procurement and integration process and commercial development cycles
- Potential adversaries have access to same capabilities

Different Ways to "Use Commercial"

- Use commercial service
  - Accept limitations
- Work with vendors to create "special" services
  - Address limitations
- Procure use of part of commercial infrastructure
  - Government operates segregated system
- Buy commercial systems to build Government-owned infrastructure
- Use commercial technology to build Government-unique systems



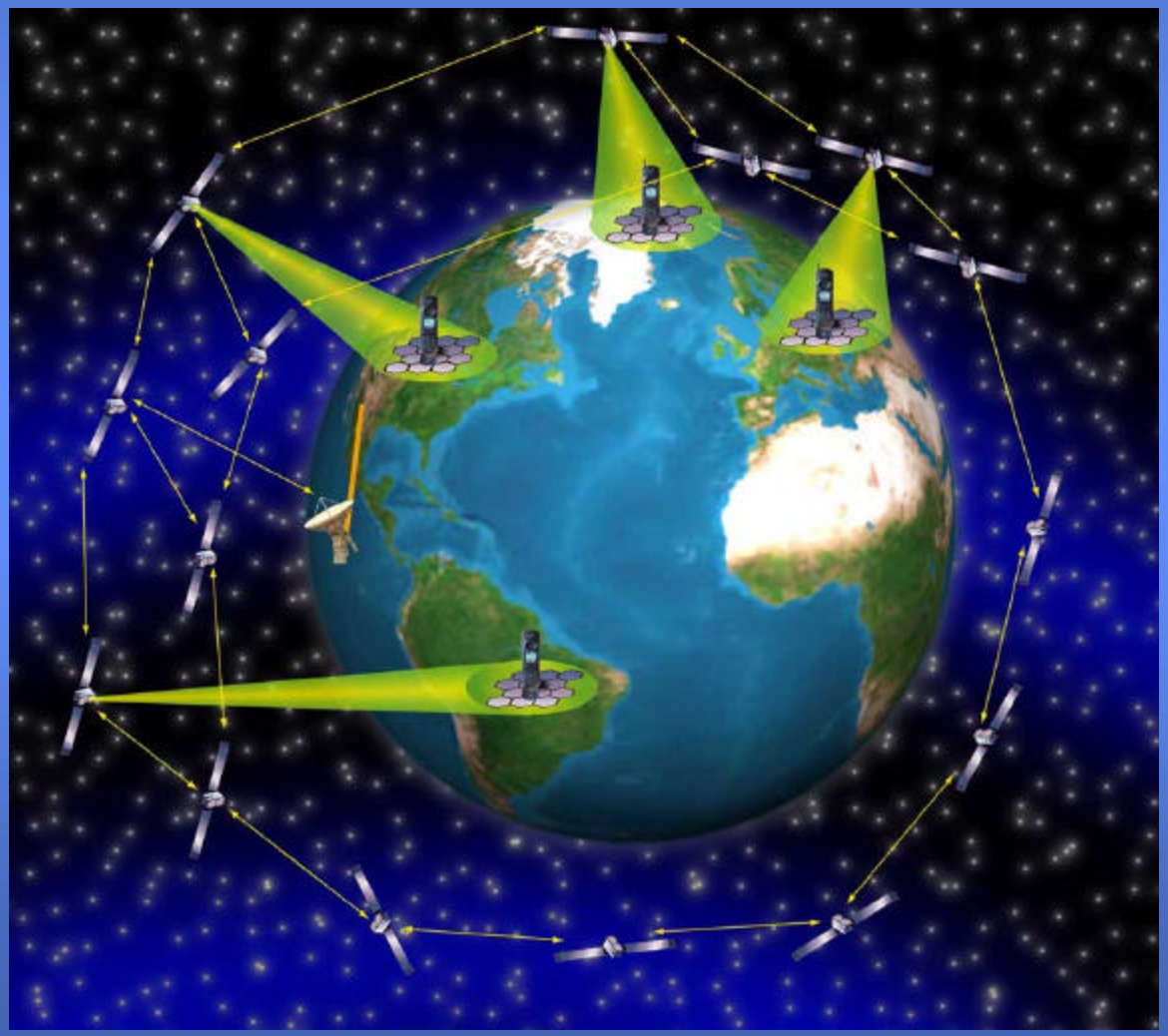
Commercial System Analysis
Real Capabilities and Limitations

Color brochures too often look alike

- **Offered Services**
  - **Coverage (satellite, gateways, licensing)**
  - **Voice/data/messaging/paging**
  - **Airborne Services**
  - **Multi-mode services**
- **System Operation Details**
  - **Link Margin Information**
  - **Information Flow**
  - **Operational limitations**

Leveraging Commercial Communications

A Case Study and Lessons Learned



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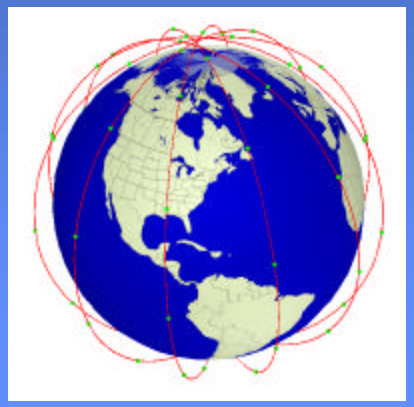
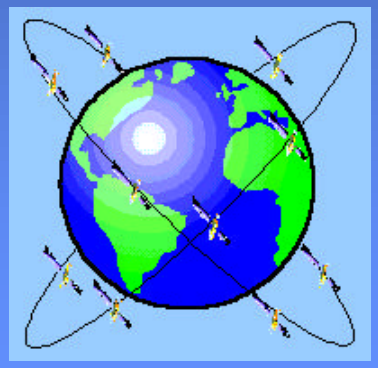
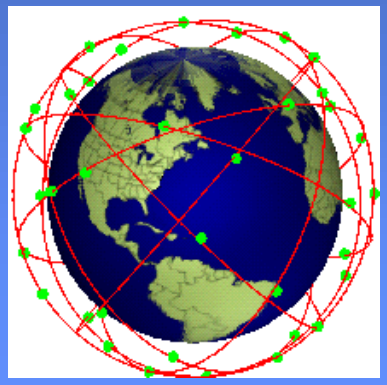
MSS Architectures



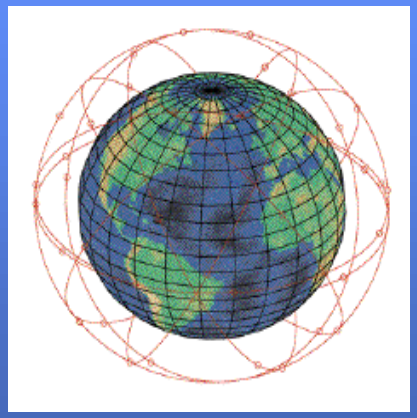
IRIDIUM
66 LEO satellites



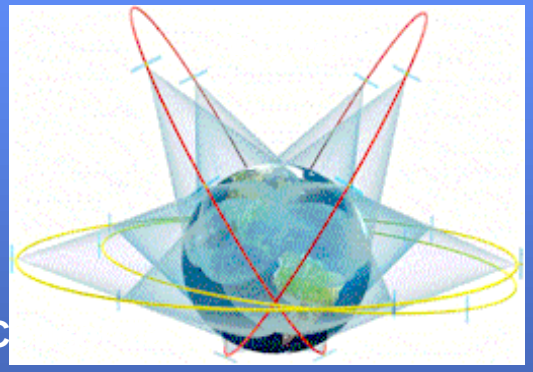
ICO
10 MEO satellites



Globalstar
48 LEO satellites



ECCO
46 LEO satellites



Ellipso
16 MEO satellites

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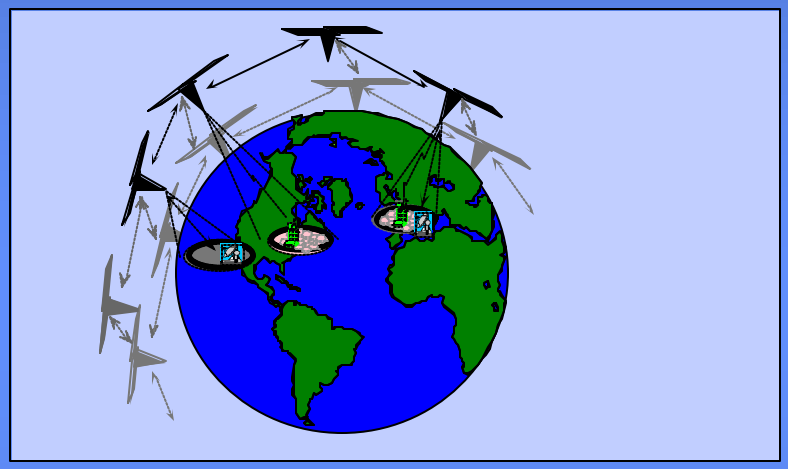
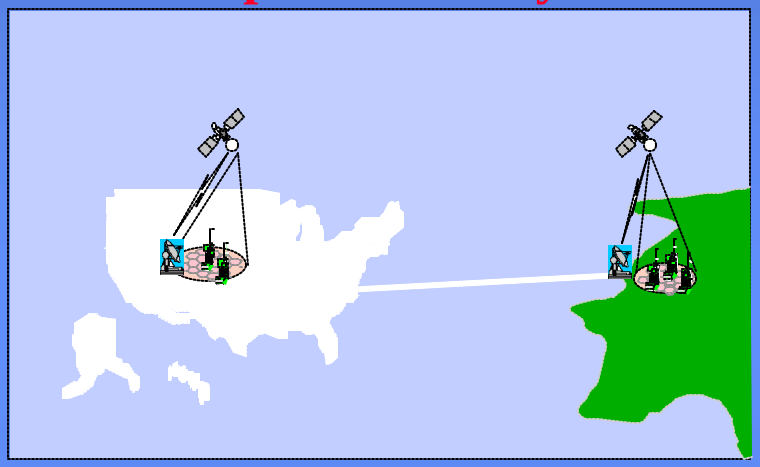
MSS Fundamentals and Strategic Direction

IRIDIUM (Motorola)



Bent-Pipe Satellite System



Near term leveraging of emerging commercial MSS infrastructure

- **Secure global handheld communications**
  - Voice/Data Path Issues
  - Signaling Issues
  - Gateway Dependence *(Coverage)*
  - Terrestrial Infrastructure Dependence

Commercial MSS (DOD Use Issues)
Limitations and Susceptibilities

- Encryption
  - No Type I capability (STU-III or STE)
- Signaling
  - No Protection of Sensitive user information (User Location, Identity, etc)
- Access
  - No DOD Control
  - No Denial of service protection
- Electronic Intercept
  - No protection of sensitive L-band data
- Features
  - No Broadcast Service
  - No Push-to-Talk Netted Service

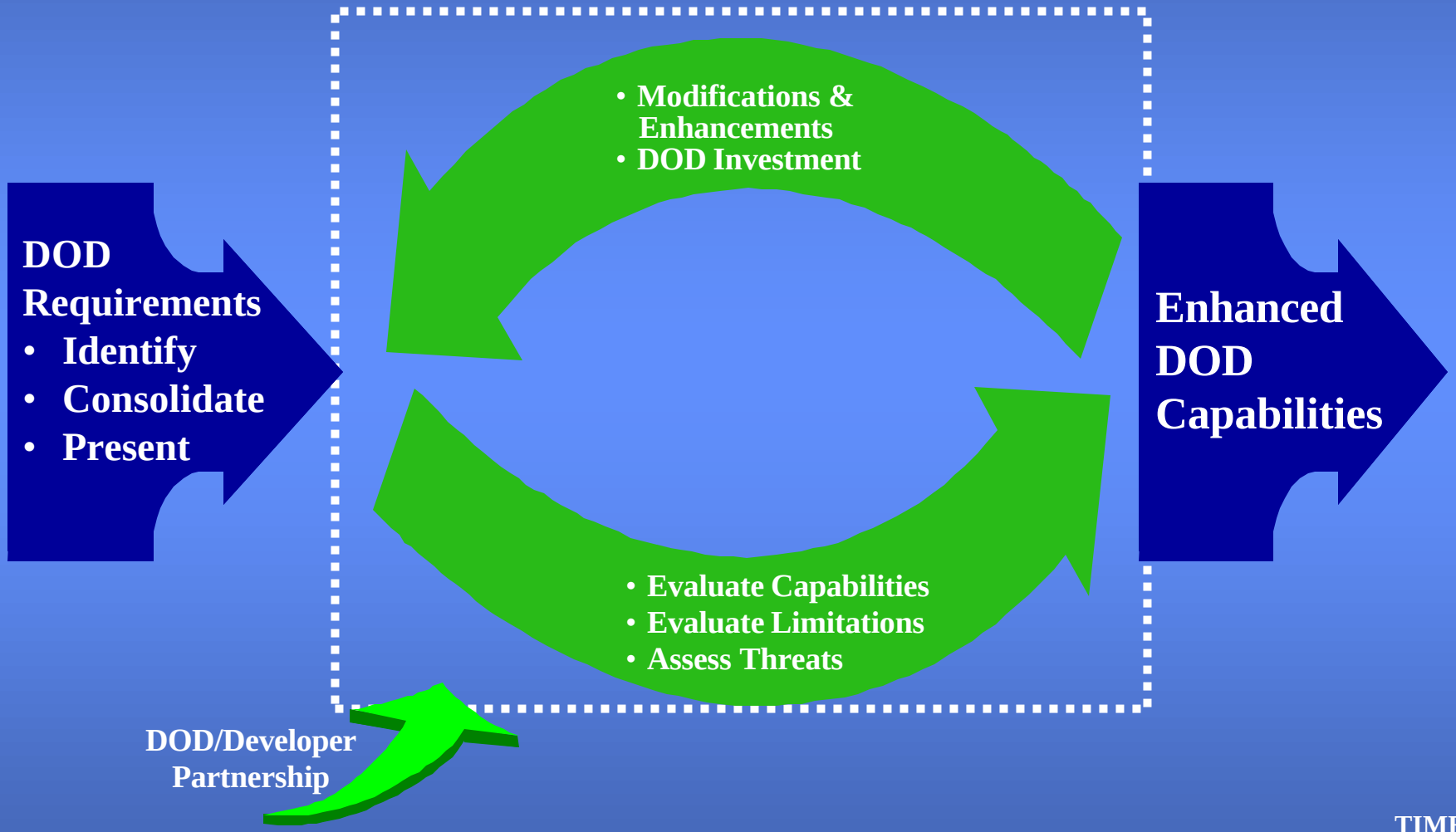
Commercial System Analysis
System Selection/Enhancement

- System enhancements specific to architecture
- Some systems can be enhanced more than others
- Finite time window for enhancements
- Funding enhancement does not always guarantee success
- DOD specific enhancements may have limited life

Key Issues

- **Understand Requirements/Missions**
- **Understand Commercial System Design**
- **Understand Economic Drivers**

Enhancement Issues Strategy -- *Engage Early*



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Enhancement Issues
Realization

- Not all enhancements achievable
  - Not Affordable
  - Inconsistent with commercial operation
  - Time window expired
  - Service provider unwilling to implement
- International Issues
  - Spectrum
  - HNA/Licensing
- Commercial viability is a factor
- Limited DOD Influence
- Difficulty in identifying and estimating leveraging cost
- No Baseline Specification
  - Builds on commercial base
    - Voice quality/Data rates,User terminal characteristics
- Commercial Proprietary Restrictions
- Timing/Schedule

Lessons Learned

Trade Between Early Entry Benefits and Early Entry Risk

- Pros
  - Extensive Leveraging of Commercial Infrastructure
  - Unique Capabilities
  - Rapid Deployment Potential
  - Commercial Economies of Scale
    - User Equipment
    - Call Minutes
- Cons
  - No firm DOD Specification on Commercial Functionality
  - Dependent upon commercial viability
  - Risk of System Changes